

Mars Solar Balloon Lander, Phase I

Completed Technology Project (2004 - 2004)



Project Introduction

The Mars Solar Balloon Lander (MSBL) is a novel concept which utilizes the capability of solar-heated hot air balloons to perform soft landings of scientific payloads on the Martian surface. In the MSBL concept, a dark colored or metalized zero pressure balloon is inflated with Martian atmospheric CO₂ during initial descent suspended by a parachute.. As a result of the favorable optical qualities of the balloon's coloration, the gas inside the balloon is warmed to temperatures considerably exceeding the surrounding ambient atmosphere, thereby providing buoyancy. The MSBL can thus achieve stable level flight during daylight, or can be used to deliver payloads to the ground with arbitrarily low rates of descent. After the payload is landed, the balloon can be released for a free flight remote sensing mission, or can be retained as a tethered asset by the lander serving many useful functions, including local aerial imaging, communications, or lander towing. Key technical challenges to the MSBL concern dealing with horizontal velocity during terminal descent. However the MSBL is competitive on a mass basis when compared to alternative landing technologies such as airbags, and offers many novel additional capabilities for combined surface and aerial operations.

Primary U.S. Work Locations and Key Partners

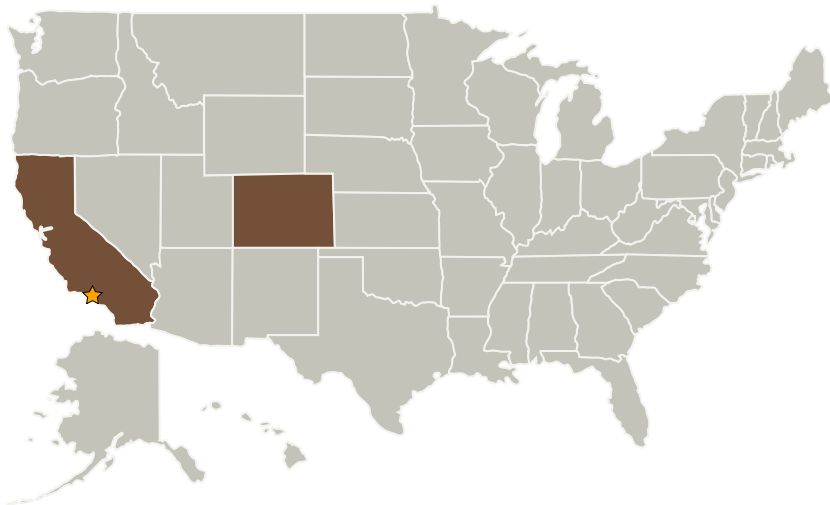
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Organizational
Responsibility**Responsible Mission
Directorate:**Space Technology Mission
Directorate (STMD)**Lead Center / Facility:**

Jet Propulsion Laboratory (JPL)

Responsible Program:Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
Pioneer Astronautics	Supporting Organization	Industry Historically Underutilized Business Zones (HUBZones)	Lakewood, Colorado

Primary U.S. Work Locations

California	Colorado
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Robert Zubrin

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
 - └ TX09.2 Descent
 - └ TX09.2.1 Aerodynamic Decelerators